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		DB=USPT; PLUR=YES; OP=ADJ	
☐	L18	4974419.pn.	1
☐	L17	(scrim with nonwoven) and 15/$.ccls.	30
☐	L16	(scrim with nonwoven) and cleaning pad	10
☐	L15	scrim and cleaning pad	39
☐	L14	scrim and cleaningpad	0
☐	L13	L11 and fabric	1
☐	L12	L11 and scrim	0
☐	L11	5090832.pn.	1
☐	L10	L9 and (pad or implement)	20
☐	L9	L8 and 15/$.ccls.	35
☐	L8	super absorbent or superabsorbent	4151
☐	L7	L4 and (j500 or j550) and (gel$ or foam)	3
☐	L6	L5 and (gel$ or foam)	36
☐	L5	L4 and super absorbent	50
☐	L4	waterlock or water lock	561
☐	L3	L1 and (j500 or j550)	5
☐	L2	L1 and superabsorbent	78
☐	L1	grain processing with muscatine	495

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☐	L2	L1 and cleaning pad	24
☐	L1	superabsorbent	3387

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L6: Entry 2 of 36 File: USPT Mar 11, 2003

DOCUMENT-IDENTIFIER: US 6530472 B2
TITLE: Shipping container with anti-leak material

Abstract Text (1):
A safety container for shipping or storing vials containing hazardous liquids. The container is constructed of a liquid impermeable outer layer and an interior layer that is embedded with a super absorbent polymer that will immobilize and stabilize any fluid that leaks from the vial. The container has an opening through which the vial is inserted which is sealed prior to shipment.

Brief Summary Text (2):
The present invention relates to a shipping container for hazardous or other fluids by using a super absorbent polymer such as a polyacrylate material that will immobilize a leaking fluid if contacted thereby and form an expanding gel that will stabilize the container and its contents.

Brief Summary Text (6):
When the outer layer dissolves, the inner contents are released and form a gel-like substance by absorbing the blood. The inner content is sodium polyacrylate having the formula (C3H3O3Na)n. It is obtainable under the trademark WATER LOCK J-550 from Grain Processing Corporation.

Brief Summary Text (10):
A safety container for shipping or storing vials containing hazardous liquids. The container is constructed of a liquid impermeable outer layer and an interior layer that is embedded with a super absorbent polymer that will immobilize and stabilize any fluid that leaks from the vial. The container has an opening through which the vial is inserted which is sealed prior to shipment.

Drawing Description Text (13):
FIG. 12 is a diagrammatic cross-section of a flexible container wherein the cushioning foam layer is added; and

Drawing Description Text (14):
FIG. 13 is a diagrammatic cross section of a portion of the container with a thick absorbent laminate to house the super absorbent and provide cushioning.

Detailed Description Text (2):
The present invention relates to packaging units where the absorbent surrounds an inner liquid-containing vial and a liquid impermeable product surrounds the absorbent. If there is leakage the liquid

contacts the absorbent/adsorbent material and the absorbent/adsorbent material immobilizes the liquid, transforms the liquid to a gel, and the gel expands throughout the shipping container. The gel prevents the liquid from leaking from the confines of the container. By circumscribing the vial with the super absorbent polymer, leakage from the container is prevented whether the container is upright, on its side or upside down.

Detailed Description Text (3):
In hard-shell embodiments described herein, leakage is likely to occur from the liquid-containing vial because of breakage or if one of the handlers carelessly secures the cap to the vial so the cap is loosely attached to the vial. In the flexible embodiment leakage is also likely to occur for the same reasons. In either case, a principle objective of this invention is to prevent leakage from the outer container and to reduce the risk to any handler along the shipping route as well as those at the reception station. This protection is gained by the super absorbent polymer such as sodium polyacrylates and its capacity to bind the hazardous substance in a gel that will prevent leakage, reduce any chance of infection by a handler, and because of its elasticity, stabilize the position of the vial in the outer container.

Detailed Description Text (4):
The drawings are partially diagrammatic and certain dimensions thereof have been accentuated in order to better illustrate construction and operation. For instance, the vials for inner containers might be larger or smaller than that shown. The vials shown are representative in size but have been chosen primarily to leave enough room to show the expansion feature of the polyacrylate super absorbent polymer and how it reacts if a breakage or leakage occurs in the vial containing the hazardous or dangerous substance.

Detailed Description Text (6):
In the embodiment of FIG. 2, the interior of container 100 is lined with a layer or lining 110 (a laminate) that is impregnated throughout with a super absorbent polymer such as sodium polyacrylate. The layer 110 can be a woven fabric or a paper product. It can be made of any material that is somewhat porous and is capable of receiving and storing a super-absorbent product. In construction, there is sufficient polyacrylate in layer or lining 110 to absorb completely the liquid in vial 108. A second lining or coating 112 covers the layer 110. The coating or lining 112 is fluid soluble, fluid permeable or a fluid degradable material. Lining 112, the bottom 104 and the cap 106, form a cavity 114 to receive the vial 108. Vial 108 is not cross-sectioned.

Detailed Description Text (7):
The invention described herein utilizes and captures the unique characteristics of polyacrylates for shipping liquid substances. These characteristics will not only prevent escape if there are leaks from the primary receptacle, but provide safety measures because of the manner the fluid is absorbed, adsorbed or bound. Super absorbents such as sodium polyacrylate will not only absorb many times its own weight of liquid but they also form a gel that binds the liquid to itself without a chemical reaction. Further, the resulting gel is elastic and is many times the volume of the polyacrylate and liquid themselves. This provides an expansion or swelling that stabilizes and immobilizes any escaping liquid from the vial as well as stabilizing the position

of the vial with an elastic, cushion-like material.

Detailed Description Text (8):
If leaking from vial 108 occurs, these polyacrylate characteristics cause the space between the vial 108 and the interior of the container to be filled, or at least partially filled, with a gel 116 that will not only immobilize any leakage but will hinder the movement of the vial 108 by cushioning the vial so that further leakage is reduced. The gel 116 binds or locks the leaking fluid to itself to reduce the chance for inadvertent exposure of fluid substances, like hazardous fluid, to handlers. The gel will not permit blood, urine, or other such substance from migrating by mere touch or handling. Gauze, cotton or other like absorbents merely absorb the fluid. The fluid is readily released from these types of absorbing substances if squeezed, pressed or even touched.

Detailed Description Text (10):
FIG. 3 is a partial cross-section disclosing how the gel 116 will fill the container cavity 114 if a leak from the vial occurs through a crack 118 or the like. The amount of polyacrylate in layer 110 is always sufficient to absorb the amount of liquid in vial 108.

Detailed Description Text (11):
In the embodiment of FIG. 4 there is no absorbent layer or degradable layer on the bottom 104. However, a cylindrical absorbent layer 120 and an inner cylindrical degradable layer 122 are disclosed. These layers extend from top to bottom but not across the bottom. If fluid leakage occurs, for instance from the lid area or a crack in the vial, the fluid will seek the bottom of the container if the container is in its upright position. The gel migrates upwards about the periphery of the vial as the super-absorbent turns the leaking liquid into a gel. This aids in cushioning the vial uniformly about its periphery. See FIG. 5. As shown, note that layers 120 and 122 disappear as the gel forms. If the super absorbent layer 122 is embedded in non-soluble mesh, the mesh, of course, will remain after the super absorbent leaves the mesh to form a gel with the liquid. If sufficient fluid is leaked the entire cavity will be filled as shown in FIG. 3. If only a small amount of fluid is leaked, the entire cavity will not be filled.

Detailed Description Text (13):
A water impermeable layer 130 of polyethylene Tyvek (a DuPont trademark) which is a puncture resistant material, or other films such as polyester, polyethylene, polypropylene or the equivalents thereof is shown in FIG. 6. This layer 130 is also the outer surface for this embodiment. The layer 130 has two additional layers or linings applied thereto. An absorbent layer 132 containing a super-absorbent such as sodium polyacrylate is applied directly to layer 130. The layer 132 can be secured to the layer 130 by an adhesive or just applied to the layer 130, depending on the application. Over the polyacrylate layer 132 is a protective, liquid degradable, layer or liner 134. See FIG. 7.

Detailed Description Text (17):
As can be understood, the working and operation of the flexible embodiment of FIGS. 6-11 will function in a similar manner as the hard-shell embodiment of FIGS. 1-5. If a leakage occurs from the vial, the super absorbent in layer 132 will gel with the liquid and fill the cavity if sufficient fluid has leaked.

Detailed Description Text (19):
In FIG. 12 there is shown a cross-section of a wall-section wherein the base layer 130a is Tyvek (a trademark of DuPont) or other polyester equivalent. These plastics are very resistant to puncture and tearing. In all the embodiments a foam or cushioning liner 160 can be employed between the outer layer and the adsorbent/absorbent layer 132 as shown in FIG. 12.

Detailed Description Text (20):
In FIG. 13 there is shown a cushioning layer 160 that carries the super absorbent itself.

CLAIMS:

1. A container for receiving a vial that contains a first liquid therein comprising: a cylindrical sidewall having a first end and an open end; a bottom enclosing the first end of the sidewall; a removable lid for enclosing the open end of the sidewall and defining a cavity with the sidewall and the bottom; the sidewall, the bottom and the removable lid providing a substantially rigid housing that is impermeable to liquids; a lining coating the inner surface of the housing and surrounding the cavity and the lining containing a super-absorbent material that is sufficient in volume to absorb all of the liquid in the vial and expansive enough to fill the cavity with a gel when the liquid from the vial contacts therewith; the open end providing the means by which the vial can be inserted into the cavity; and the removable lid having an interior layer that comprises part of the lining.

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L17: Entry 29 of 30 File: USPT Dec 21, 1971

DOCUMENT-IDENTIFIER: US 3629047 A
TITLE: NONWOVEN FABRIC

Abstract Text (1):
Disclosed is a nonwoven fabric having high-strength properties. The nonwoven fabric is comprised of a nonwoven scrim sandwiched between at least two outer layers of nonwoven staple fibers such as cellulosic fibers. The outer layers are adhesively bonded to one another through openings in the scrim. The scrim is comprised of at least two webs, each web being comprised of a plurality of essentially parallel, continuous monofilament strands of a synthetic hydrophobic polymer. The strands of the scrim are either unbonded or only lightly bonded to one another and to the outer layers whereby they have a substantial degree of movement when stress is applied.

Detailed Description Text (3):
The inner reinforcing nonwoven ply, hereinafter referred to as the "scrim," is comprised of at least two webs, the webs being comprised of essentially unbonded continuous monofilament strands. The scrim will be detailed more fully hereinafter.

Detailed Description Text (4):
The outer nonwoven plies are comprised of staple fibers and these fibers will be of a material different from the material of the strands of which the webs of the scrim is comprised. The outer plies are adhesively bonded to one another through openings or interstices in the scrim; however, they are either unbonded or only lightly bonded to the scrim. At most, any adhesive bond between the scrim and outer plies is a poor bond while the adhesive bond between the outer layers is a good bond. Thus, the strands of the webs of which the scrim is comprised, being either unbonded or only lightly bonded to one another and to the outer plies, are free to move when external stress is applied. Thus, for example, when an external stress is applied that would tend to tear the nonwoven fabric, the strands, being free to move, move back, bunch up and reinforce one another and thus provide a rapidly mounting resistance to further tear.

Detailed Description Text (26):
Adhesive is applied from either an aqueous dispersion or an organic solvent solution thereof to either the external surfaces of the scrim 12 or to the surfaces of the outer plies adjacent the scrim. Slight bonding pressure is then applied to form nonwoven fabric 30. Pressure applied will usually be of the order of from about 10 to 100 p.s.i. The formed assembly is subsequently dried at temperatures of from about 180.degree. F. to about 300.degree. F. Nonwoven fabric 30 is comprised of outer plies 14 and 16 and scrim 12, the outer plies 14 and 16 being

bonded together through openings in the scrim by means of the applied adhesive, the strands of scrim 12 being essentially unbonded to one another and to the outer plies 14 and 16.

Current US Cross Reference Classification (1):
15/209.1

CLAIMS:

1. A nonwoven fabric comprised of a nonwoven scrim comprised of at least two webs, each web being comprised of a plurality of essentially unbonded substantially parallel, low denier, continuous monofilament strands of a synthetic thermoplastic hydrophobic material and at least two outer nonwoven plies comprised of staple fibers adhesively bonded to one another through openings in the scrim, the said outer plies being essentially unbonded to the strands of the scrim whereby the scrim strands are free to move and distribute applied stress.

2. The nonwoven fabric of claim 1 when the strands of one of the webs of the scrim make an angle of between about 45.degree. and 90.degree. with the strands of at least one other web.

7. The nonwoven fabric of claim 2 wherein at least one of the webs of which the scrim is comprised is a fibrillated striated film of a synthetic thermoplastic hydrophobic material.

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L17: Entry 25 of 30 File: USPT Nov 19, 1991

DOCUMENT-IDENTIFIER: US 5066527 A
TITLE: Sorptive article

Detailed Description Text (8):
Other nonwoven materials that may be used include air laid nonwovens, carded and random fiber nonwovens, meltblown nonwovens, needlepunched nonwovens, scrim nonwovens, spunbonded nonwovens, stitchbonded nonwovens, tow nonwovens and wet laid nonwovens.

Current US Cross Reference Classification (1):
15/229.1

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L17: Entry 27 of 30 File: USPT May 30, 1972

DOCUMENT-IDENTIFIER: US 3665543 A
TITLE: TACKY MAT STACK

Detailed Description Text (10):
The fibrous web material 32 embedded within the pressure-sensitive adhesive coating 34 and secured to the plastic film thereby is preferably a gauze-like fabric of open-weave construction. However, similar highly porous fibrous structures such as scrims or other nonwoven webs could be utilized in accordance with the present invention to cooperate with the plastic films and provide the desired reinforced strength characteristics needed in the composite sheet.

Current US Original Classification (1):
15/215

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L7: Entry 3 of 3 File: USPT Dec 4, 1990

DOCUMENT-IDENTIFIER: US 4974419 A
TITLE: Apparatus and method for simultaneously heating and cooling separate zones

Abstract Text (1):
Disclosed is a device for simultaneously heating and cooling adjacent food portions. A first module defining a first hollow chamber is formed into a substantially planar surface for supporting the food portion to be cooled. The first chamber contains a vaporizable substance in equilibrium with vapor. A second module defining a second hollow chamber is likwise formed into a substantially planar surface for supporting the food portion to be heated. The second chamber contains a sorbent and is evacuated. The chambers are fluidly interconnected by a conduit having a normally closed valve to prevent egress of vapor from the first chamber. In use, the valve is open, allowing vapor from the first chamber to flow into the evacuated second chamber. The resulting drop in pressure allows the vaporizable substance in the first chamber to change phase into vapor, thereby cooling the first chamber and its associated food portion. Moisture in the vapor entering the second chamber is absorbed by the sorbent, which evolves chemical reaction heat, thereby heating the second chamber and its associated food portion. The first and second modules of the present invention may be conveniently placed in adjoining pockets of a foam container for containing the cold and hot portions of a sandwich or other fast food.

Brief Summary Text (5):
Recently, one restaurant chain has attempted to overcome this problem with a hamburger sandwich served in a dual package. The package is a foam container, one side of which contains the hot meat on the lower half of the bun, and the other side of which contains the lettuce and tomato on the upper half of the bun. The stated objective of this arrangement is to keep the hot side hot, and the cool side cool.

Brief Summary Text (6):
To a certain extent, this arrangement is successful. Keeping the hot and cool components separate prevents direct heat transfer between the hot meat patty and the cool lettuce and tomato. Nevertheless, both sides of the sandwich come to room temperature within a short period of time. This is due to the relatively poor insulation afforded by the foam containers. Thus, unless such a sandwich is eaten soon after being placed in the container, it will be close to room temperature. This presents a problem for consumers unable to eat their sandwiches at the restaurant. For example, those who wish to eat in their cars, at beaches or at picnic areas must do so with a sandwich which is tepid at best.

Brief Summary Text (7):
One alternative method for maintaining the temperature of separate hot and cold portions of food would be to use containers made of better insulation. For example, the typical fast food package is made of foam, 0.070 inch thick. The insulation quality could be improved at the expense of both cost and space. Apparently, the industry has not found it feasible to improve the insulative quality of its packaging.

Brief Summary Text (8):
Moreover, foam packages are not biodegradable, and their perpetual existence has led legislatures in several states to consider banning their use. These environmental concerns are not the least of the drawbacks of foam containers.

Detailed Description Text (3):
The first (cooler) module 12 contains a vaporizable substance which may be liquid, or in a preferred embodiment, may be fixed in a solid form by incorporation into another substance. Vapor is in equilibrium with the vaporizable substance at low pressure at ordinary ambient temperatures. The vaporizable substance may be water, and in a particularly preferred embodiment water is fixed into a distributed film or gel by incorporation into a starch-acrylic polymer, such as the material denominated by the trademark Water Lock Model J550 (Grain Processing Corporation, Muscatine, Iowa 52761).

Detailed Description Text (19):
The sorbent material used in heater module 14 is preferably capable of absorbing or adsorbing all the vapor produced by the vaporizable substance, and also preferably will meet government safety standards for use in an environment where contact with food may occur. Suitable sorbents for various applications may include barium oxide, magnesium perchlorate, calcium sulfate, calcium oxide, activated carbon, calcium chloride, glycerine, silica gel, alumina gel, calcium hydride, phosphoric anhydride, phosphoric acid, potassium hydroxide, sulfuric acid, lithium chloride, ethylene glycol, and sodium sulfate.

Detailed Description Text (23):
As shown in FIGS. 1 and 2, the temperature changing device of the present invention may be advantageously adapted to be placed into a food container 60 having separate zones defined by pockets 62, 64 for separate hot and cold food portions. Such containers may be made of foam, paper, cardboard, or plastic, but are preferably made of a biodegradable substance having insulative qualities. The container should be lightweight, inexpensive, non-bulky, and disposable. Preferably, the container includes a top 66 (shown in phantom in FIG. 2) for preventing heat transfer from the hot and cold food portions.

Detailed Description Text (28):
The heat required to maintain a closed, empty styrofoam container of dimensions 4.75.times.4.75.times.1.75 and wall thickness 0.070 in. at 56.degree. F. temperature rise for 30 minutes was determined by placing a temperature sensor together with a small electrical heater inside the box, bringing the temperature to 56.degree. F. temperature rise about one hour, and metering the power delivered. Under these conditions, 10 watts, or 31.4 Btu of power was required The sorbent to be used in the heat modules generated 1.8 times the latent heat of vaporization of

water; thus a quantity of water having a latent heat of 23 Btu or 10 ml of water in the form of a distributed film of Water Lock Model J550 starch-acrylic polymer (Grain Processing Corporation, Muscatine, Iowa 52761) was placed in cooler module 12. A quantity of 85 grams of Multiform Desiccants, Inc. (Buffalo, N.Y. 14213) type 4A desiccant in 1/16 diameter beads was placed in heater module 14. Both heater 14 and cooler 12 modules were constructed of 0.003 inch thick copper foil sheet in dimensions to fit the styrofoam test cavities. The copper sheet was soldered at the edges to provide an airtight seal. The modules were joined by a conduit of heavy-walled plastic tubing in which a frangible valve in a closed position had been inserted. Both modules were evacuated, reducing the pressure in heater module 14 to a virtual vacuum and that in cooler module 12 to the vapor pressure of water at ambient temperature.

CLAIMS:

13. The container of claim 1, wherein said vaporizable material is water incorporated into a gel.

14. The container of claim 13, wherein said gel is formed with a starch-acrylic water-fixing polymer.

18. A method of simultaneously heating and cooling adjacent zones, comprising the steps of:

(a) providing a heating and cooling apparatus, comprising:

(1) a container, the interior of which is divided into thermally separated first and second zones;

(2) a first module for cooling the first zone, said first module containing a vaporizable liquid comprising a water-containing gel having a vapor pressure, said water incorporated into a distributed film comprising a starch-acrylic water-fixing polymer having a vapor pressure;

(3) a second module for heating the second zone, wherein said second module is evacuated and contains a sorbent for said vaporizable substance;

(4) a conduit connecting said first and second modules; and

(5) a valve in said conduit for selectively allowing flow through said conduit between said modules;

b. opening said valve, thereby connecting said first and second modules, whereby the pressure in said first module is reduced, causing said vaporizable substance to vaporize; and

c. removing said vapor from said first module by collecting same in said sorbent, such that the vaporization of said vaporizable substance serves to cool said first module, thereby cooling said first zone, and the sorption of said vapor in said sorbent serves to heat said second module thereby heating said second zone.

37. A method of simultaneously heating and cooling adjacent zones,

comprising the steps of:

a. providing a heating and cooling apparatus, comprising:

(1) a disposable, unitary container, the interior of which is divided into thermally separated first and second zones;

(2) a first module for cooling the first zone, said first module containing water incorporated into a gel, said water having a vapor pressure;

(3) a second module for heating the second zone, wherein said second module is evacuated and contains a sorbent for said water;

(4) a conduit connecting said first and second module; and

5) a valve in said conduit for selectively allowing flow through said conduit between said modules;

b. opening said valve, thereby connecting said first and second modules, whereby the pressure in said first module is reduced, causing said water to vaporize; and

c. removing said vapor from said first module by collecting same in said sorbent, such that the vaporization of said water serves to cool said first module, and the sorption of said vapor in said sorbent serves to heat said second module thereby heating said second zone.

39. An apparatus for simultaneously heating and cooling separate zones, comprising:

a container divided into first and second zones;

a first module thermally coupled to said first zone for cooling said first zone, said first module containing a vaporizable liquid comprising a gel, said gel comprising a starch-acrylic water-fixing polymer having a vapor pressure;

a second module thermally coupled to said second zone for heating said second zone, said second module being evacuated and containing a sorbent for said vaporizable substance;

a conduit for establishing a fluid connection between said first and second modules; and

a valve in said conduit for selectively allowing flow through said conduit between said modules such that opening said valve to connect said first and second modules permits said vaporizable substance to vaporize, thereby forming a vapor, and permits said vapor to pass through said conduit and into contact with said sorbent, which sorbs and removes said vapor such that the vaporization of said vaporizable substance serves to cool said first module, and the sorption of said vapor by said sorbent serves to heat said second module.

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